Distributed inverter architecture wikipedia

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In general, a distributed architecture using string inverters yields a slight cost advantage in smaller arrays, while central architectures offer the lower cost per watt for larger PV installations. While every project is different, system modeling of first costs and energy production indicates a crossover point at approximately 350 kW-AC. As both North American market availability and functional capabilities of string inverters rapidly increase, it is likely that this crossover point will move up to larger and larger systems.

Creating an optimal design requires a more thorough evaluation of the specific capabilities and levelized cost of energy (LCOE) for each solar inverter option being considered. Other factors to consider include:

–DC and AC system compatibility: On the DC side, inverters must be compatible with either 600V or 1000-Vdc panels, and are expected to support an increasingly large ratio of DC to AC output. On the AC side, three-phase inverters in the United States and Canada must be able to connect to service panels at either 208V, 480V, or 600V AC.

–Code Compliance and interconnect requirements: System designers need to consider the varying codes and utility interconnection requirements for each project location and ensure selected inverters and any external disconnects, combiners and recombiners meet those requirements. Inverters may need to offer grid support functions that can be pre-set or dynamically controlled.

–Reliability: A reliability study should be completed to determine central and string inverter failure rates, manufacturing quality control, and product quality initiatives. Warranty and optional extended warranty offerings should also be evaluated.

–O& M: With distributed architectures, maintenance expense is greatly reduced because string inverters, particularly when they are convection cooled, do not require the preventive maintenance typical for central inverters, such as inspection of the cooling system, thermographic imaging, and replacement of air filters.

–Investment Performance: To create a comparison of the advantages and disadvantages of either central or distributed architectures, the system designer may calculate several financial metrics, including projected energy harvest, LCOE, return on investment, and net present value.

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